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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Paper No. 18

Application Number: 09/735,503  
Filing Date: December 14, 2000  
Appellant(s): WANG, JOHN ZHIQIANG

\_\_\_\_\_  
Alan M. Kagen  
For Appellant

**EXAMINER'S ANSWER**

**MAILED**  
**SEP 03 2003**  
**GROUP 1700**

This is in response to the appeal brief filed 5/27/03.

**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Issues***

The appellant's statement of the issues in the brief is correct.

**(7) *Grouping of Claims***

Appellant's brief includes a statement that claims *I. 2-4 and II. 6-8* do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

**(8) *Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(9) *Prior Art of Record***

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-4 and 6-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Gemma et al (US 4,605,452).

Gemma et al disclose orienting the single crystal in a configuration to provide a better fatigue resistance, similar to the orientation described in applicant's specification, pertaining to the tuning of the natural frequency. Although Gemma et al do not explicitly disclose the tuning of the "natural frequency", it is inherent that every time when Gemma et al arrange the crystal seed to a different orientation, at any angle, the natural frequency has been tuned to a different value. Gemma et al discloses the manufacturing of a turbine blade comprising the steps of investment casting the turbine blade with a single crystal having controlled secondary crystallographic orientation (abstract). The single crystal is placed in a desired orientation *including all angles from 0 to 90 degrees* (col. 13, lines 1-6) to provide a better fatigue resistance (col. 3, lines 10-50). *The orientation of the seed is preferred between zero and twenty degrees (col. 3, lines 39-41, col. 12, lines 52-65).* The secondary orientation would not affect the turbine blade's weight, the turbine blade's shape, or the flexure mode of the turbine blade, since the flexure frequencies is insensitive to the secondary orientation as acknowledge conventionally by applicant (page 3, lines 24-26 of applicant's specification).

*(11) Response to Argument*

**Group I. Claims 1-4**

Applicant first argues that claim 1 of the present invention, “specifies that the crystal seed is placed along a desired direction to thereby effect a desired percentage change in the natural frequency of the turbine bucket. Since Gemma merely orients a single crystal to provide better fatigue resistance, Gemma at least lacks even a remote teaching or placing the crystal seed along a desired direction to effect a desired natural frequency percentage change.” Examiner respectfully disagrees with the argument asserted by applicant regarding to “placing the seed along a desired direction to effect a desired natural frequency change”. As explained earlier in paragraph 10, that Gemma et al disclose orienting the single crystal in a configuration to provide a better fatigue resistance, similar to the orientation described in applicant’s specification, pertaining to the tuning of the natural frequency. Although Gemma et al do not explicitly disclose the tuning of the “natural frequency”, it is inherent that every time when Gemma et al arrange the crystal seed to a different orientation, at any angle, the natural frequency has been tuned to a different value. Therefore, the Gemma et al clearly placed the seed along “a desired direction” to thereby effect a desired percentage change in the natural frequency, since the seed is placed in a different orientation, second orientation, from the first (primary) orientation.

Next, it is argued that the examiner had suggested during an interview conducted on July, 16, 2002, claim 1 to amend and specify that the crystal seed can be placed along the desired direction according to an orientation including all angles between 0-90 degrees relative to the engine axial direction. At the time of the interview, applicant did not claim any degrees of

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orientation. Examiner had suggested the applicant to narrow the claims including the specific angles of orientation. However, a closer reading of the Gemma et al patent, examiner had found applicant's claimed language not overcoming the prior art, Gemma et al, since Gemma et al disclose having the crystal orientation from 0 to 90 degrees, however, preferred between 0 to 20 degrees (col. 13, line 5). Applicant persistently argued that Gemma et al in fact teaches away from other orientation angles. However, Gemma et al disclose the claimed invention as claimed.

**Group II. Claims 6-8**

In page 6, 2<sup>nd</sup> paragraph, applicant argues the differences between controlling the frequencies and fatigue. However, examiner respectfully does not understand the significance of this statement to the claims of record. In addition, applicant's invention as explained in the specification in page 1, lines 12-16, "that any stimulus frequencies is close enough to the natural frequency of the rotational turbine bucket, resonance may occur that will likely cause failures, usually catastrophic, to the bucket due to high cycle fatigue". Therefore, applicant's invention is not distinct from Gemma et al, since applicant's invention is concerned with the failure cause by fatigue of the turbine bucket.

In page 6, 3<sup>rd</sup> paragraph, applicant argues that "Gemma's method produces an optimal angle of -10 to 20 degrees, while as noted, the method of the present invention could produce a secondary angle of any value". Examiner acknowledges the claimed angles of the present invention between 0 to 90 degrees. However, Gemma et al disclose having a secondary orientation within the range.

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In page 7, 1<sup>st</sup> paragraph, applicant argues "Gemma's invention is not to control the secondary orientation but to use the secondary orientation to reach a certain objective".

Examiner respectfully disagrees. Gemma et al has to control the secondary orientation in order to use the secondary orientation to reach a certain objective, reducing fatigue.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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August 9, 2003

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